

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

**CLASS: B.TECH  
BRANCH: EEE**

**SEMESTER : VII  
SESSION : MO/2022**

**SUBJECT: EE605 MICROGRID OPERATION AND CONTROL**

**TIME: 3:00 Hours**

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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		CO	BL
Q.1(a)	Give the definition of distributed generation with examples.	[2] A	1
Q.1(b)	Enumerate the advantages of distributed generation technology. What are the main concerns of existing centralized power system?	[3] A	2
Q.1(c)	Draw the generalized layout of microgrid and explain its architecture.	[5] A	2
Q.2(a)	Enumerate the main tasks of a microgrid controller.	[2] D	1
Q.2(b)	Classify microgrids based on power type.	[3] A	2
Q.2(c)	Draw a DC microgrid structure and explain its working.	[5] A	3
Q.3(a)	What are the two performance categories defined for DERs with voltage regulation capabilities? What does EPS means? Give the definition of local EPS and area EPS.	[2] B	4
Q.3(b)	What are the power quality standards in terms of harmonics as mentioned in IEEE 1547- 2018 standard?	[3] B	3
Q.3(c)	In brief, discuss what IEEE 1547 standard is and what it is not. With the help of data, discuss the reactive power requirements for DERs operation as per IEEE 1547-2018 standard.	[5] B	3
Q.4(a)	Represent the power flow in a PV based microgrid through a flow diagram.	[2] C	2
Q.4(b)	Draw the different power electronic converter schemes for wind energy conversion system and explain their workings.	[3] C	2
Q.4(c)	Present the hierarchical control structure of a wind energy conversion system through a diagram and explain the working.	[5] C	4
Q.5(a)	What do you mean by local control?	[2] D	1
Q.5(b)	Discuss the droop characteristics in conventional power systems with the help of a single machine infinite bus system.	[3] D	2
Q.5(c)	What are the major problems associated with microgrid protection? Explain the 3S criteria of distribution system protection design.	[5] E	4

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